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ABSTRACT

The problem of evaluating school progress and its programs has recently been the topic of much research and discussion. The Center for the Study of Evaluation confronted this problem and produced the CSE Elementary School Evaluation KIT: Needs Assessment as a partial solution (see ED 058 673.) Within the framework of the KIT, the need for school norms and that of accounting for various demographic differences between schools arose. By using a multiple regression approach, six demographic variables were singled out as important predictors of achievement on a standardized test (the SCAT). Using these variables to create 64 school types, percentile correction factors were determined by using once again the regression technique. The problem of converting a school score to a school percentile with only a norm table for individuals was also studied, and a procedure for converting a percentile score from an individual's norm table to a school percentile was outlined. This procedure was based on successive average of the ratios of variability between school scores and individual scores as reported in the technical manual of these tests. (Author)

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DIFFERENTIATED SCHOOL WORKS

William J. Doherty

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TABLE OF CONTENTS

	Page
DIFFERENTIATED SCHOOL NORMS	3
Coding the School Variables	5
Results of the Multiple Regression	9
Computing the Profiles	10
A Partial Validation	11
DEVELOPMENT OF SCHOOL NORM ESTIMATIONS	13
UTILIZATION OF DIFFERENTIATED SCHOOL NORMS IN THE KIT	14
SUMMARY	17
REFERENCES	18

TABLES

1. Number of School Units Analyzed at each Grade Level	19
2. Description of Original Variables Before Coding	20
3. List of Final Variables Resulting from Coding Process	22
4. Correlation Matrix of Questions #5 and #7 Responses with SCAT Total Score	23
5. Correlation Matrix of Questions #14 and #18 Responses with SCAT Total Score	24
6. Codes for Regroups of the United States and Field Test Sample	25
7. Correlation Matrix of 19 Final Variables and SCAT Total Score for Grade Three	26
8. Correlation Matrix of 19 Final Variables and SCAT Total Score for Grade Four	27
9. Correlation Matrix of 19 Variables and SCAT Total Score for Grade Five	28
10. Correlation Matrix of 19 Variables and SCAT Total Score for Grade Six	29
11. Regression Weights and Proportion of Variance for Final Six Variables	30

TABLE OF CONTENTS (Continued)

		Page
12.	Correction Factors to Add (+) or Subtract (–) to Obtain Differential School Norms.	31-32
13.	Individual and School Means and Standard Deviations for the SCAT.	33
14.	Individual and School Means and Estimated School Standard Deviations for CTBS.	34
15.	Differences in CTB and ETS Percentile Corrections for Each Profile.	35-37
16.	Estimated Deviation Ratios for Four Grade Levels and Forty-One Goal Areas.	38
17.	School Norm Estimated from Percentile Mean Pupil Score and Deviation Ratio for Goal Area	39-40
18.	Questions for Determining Your Differentiated Profile	41

APPENDIX A

School Characteristics Questionnaire. 42

APPENDIX B

Coding of the School Characteristics Questionnaire for ETS Data. 43

A great deal of pressure has recently been placed on the American educational system. The economic situation of the country and the recent social upheavals have been two major sources of this pressure. Now, there is more interest in studying the differences in educational achievement produced by such factors as race and social class. Also, because of the difficulties in balancing school budgets, there is a greater demand for evaluations of school programs, with regard to their success or failure.

The educatoral decision makers faced with this pressure are responding to it in various ways. Many are trying to find better ways to determine the needs of their schools and students. Also, they are placing greater emphasis and importance on the use of standardized tests to measure educational achievement. The Center for the Study of Evaluation has attempted to assist decision makers with regard to these two areas. To enable the principal or other decision maker to adequately determine the educational needs of his school, the CSE Elementary School Evaluation KIT: Needs Assessment (Hoepfner, et al., 1970) was developed. To assist the educator with the selection and evaluation of standardized tests, the CSE Elementary School Test Evaluations (Hoepfner, et al., 1970) was made available.

The KIT takes the decision maker through a step-by-step process which results in a priority ordering of 106 different educational goals as seen by the parents and teachers of his school. The KIT also assists the educator in selecting tests to measure the goal areas which have been chosen as most important. In the last part of the KIT, the educator is given procedures which enable him to determine the utility of implementing new programs in the goal areas.

Implicit with the use of the KIT is the use of one or more appropriate standardized tests. One of the most important steps in using such a test is the interpretation of the results which it yields. With a norm-referenced test, this step usually entails a comparison of the raw score obtained by the individual with a table of scores supplied by the test publisher. This table of scores

is referred to as a "norm table." Essentially this table allows for comparison of the scores from the specific individuals at hand with the scores received by a sample of people (the normative sample) which was selected on some particular criteria. The sample is characteristically chosen so as to be a nationwide sample, often balanced on specific aspects such as age, grade or region. To aid in this comparison of scores the original raw score is converted to a more easily interpretable score such as a percentile score or a grade-equivalent score.

While this whole procedure is rather simple and straightforward, there are several assumptions which could hamper interpretation of scores. The first of these assumptions is that the normative sample is really representative and that the results from such a sample hold equally well for all individuals. This assumption will be reasonable in the majority of cases, but would hardly be defensible if the individuals who were tested differed greatly from the normative sample with respect to such variables as race or socio-economic status. The second assumption is that one will only want to interpret individuals' results. As mentioned previously, there is now a greater emphasis being placed on evaluation of programs, not just the individual students within them. This type of evaluation requires norm tables where the normative sample is not composed of individuals but rather of schools or classrooms. It is interesting to note that of the over 1600 different scales rated in the CSE Elementary School Test Evaluations (Hoepfner, et al., 1970), only three tests supplied norm tables for schools as well as individuals. What is a principal or other educator to do if he wishes to evaluate programs within his school and finds he must use a standardized test with only pupil norms? How is he to interpret the results of such a test if his school differs widely from those used to create the norm table?

The rest of this paper will describe an attempt to solve both of these problems. The solution to the second problem will be treated under the title of differentiated school norms.[1] After a discussion of these norms and how they were arrived at, a procedure for converting pupil norms to school norms will be presented. Lastly, an example of how differentiated school norms can be utilized within the framework of the Elementary School Evaluation KIT: Needs Assessment will be presented.

Differentiated School Norms

While the notion of norms which would take into account the effects of various demographic variables such as socioeconomic class, racial-ethnic composition, or geographic region seems highly worthwhile, the method for creation of such norms has been mere speculation. What course was to be taken in arriving at the desired end? The logical first step seemed to be to determine the effects of various demographic variables upon achievement as measured by a standardized test. The method of analysis chosen to accomplish this step was stepwise multiple regression. The use of stepwise multiple regression would allow for the estimation of importance of the various demographic variables with regard to achievement as well as to allow for selection of a subset of variables which were the most important. Once this approach to the creation of the norms was decided upon, all that remained was to gather data regarding the demographic variables and achievement.

The gathering of the demographic data was accomplished by use of a questionnaire developed at the Center of the Study of Evaluation (CSE). The

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[1]The term differentiated school norms is a result of a discussion between Ralph Hoepfner, who directed the development of the Needs Assessment, and Dr. Norman Fredrickson of Educational Testing Service.

School Characteristics Questionnaire (SCQ), consisted of eighteen questions which examined different aspects of the school, its staff, and its students. (The final form of the SCQ appears as Appendix A.) Many of these variables are similar to those used by others who have researched schools' characteristics and achievement, such as Coleman, et al., (1966) and Project Talent (Flanagan et al., 1962). Other variables, however, are more specific to the purpose of the KIT developed by CSE. While the questionnaire provided valuable descriptive data, the ultimate determinate of important variables for differentiating achievement norms was their relation to test performance.

The choice of which achievement test to use for creation of the differentiated norms was affected by availability. The Educational Testing Service (ETS) was at the time conducting a re-norming of their School and College Ability Tests (SCAT) for grades 3-8 on a nationwide basis. ETS agreed to provide CSE with the achievement data gathered from this new data as well as to request that all participating schools fill out and return the SCQ.[2] Test score data were kept confidential by ETS in that no school names or any other specific identifying information was released by CSE.

Upon receipt of these data the responses to the questionnaire were coded and punched onto IBM cards. The coding procedure for the original responses can be found in Appendix B. In addition, for each classroom from a school, the average test scores on the SCAT were coded and punched. Usually, there was only one classroom from a school at a specific grade level. These test achievement cards were then collated with the appropriate demographic

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[2] Special thanks are extended to Dr. John Biancini of the Educational Testing Service in Berkeley for his cooperation with CSE.

variable cards to provide the data for the stepwise multiple regression analysis. (See Table 1 for a list of the number of cases per grade.)

Before the regression analysis was undertaken, a number of decisions were formulated which were to guide the rest of the analysis procedure. First, it was felt that the combination of demographic variables which were selected by the regression analysis should result in distinct and independent school types. The decision was made to use only dichotomous demographic variables as independent variables, even though this would probably result in a lower multiple correlation coefficient. Second, the minimum number of variables that would account for an optimal amount of score variation would be chosen as the most concise set of variables. Having fewer retained independent variables would keep the school types to a minimum. Lastly, it was decided that the dichotomization points for the independent variables, arrived at for one grade level, should be kept the same for all grade levels under consideration. The level specifically examined was grade three.

Coding the School Variables

The process of arriving at the dichotomous variables to be used in the final stepwise multiple regression was itself an employment of regression analysis. Question 5, 7, 14, and 18 from the SCQ were such that there were several categories of possible response to each question. Initially, each of these individual responses was treated as a separate variable for the preliminary analysis. This approach resulted in 46 independent variables to be used in the first multiple regression. A list of the initial variables can be found in Table 2.

From a statistical standpoint, the best possible point at which to dichotomize a continuous variable is at the median. This guideline was

followed as closely as possible. Therefore the coding for several questions was rather simple; it was at a point as near as possible to the median. This strategy was employed for questions 2, 3, 4, 6, 8, 9, 10, 11, 12, 13, 15, 16, and 17. In some cases two values resulted in approximately the same proportions. The dichotomies resulting from these points were all correlated with the dependent variables and the decisions to adopt any of them were based on these zero-order correlations and upon the ease and reasonableness with which each dichotomy could be obtained. The various dichotomization values can be found in Table 3.

The dichotomization of questions 5, 7, 14, 18 and of the Geographic Region variable was a more complicated problem. The complication arose from the nature of these questions. As was mentioned previously there were several possible categories of response to each of these questions and initially each category was treated as a separate variable. However, it was felt that these various categories should be combined in some optimal way to represent the data sought by the original question. Separate regression analyses using only these variables from questions 5, 7, 14, 18 and Geographic Region were computed. These regressions used the SCAT math subtotal, SCAT verbal sub-total, and SCAT total as dependent variables. Examination of the correlations and b-weights for these separate analyses led to possible coding schemes for each of the questions. These regressions are reported in Tables 4 and 5.

For question 5, three possible schemes were derived. They were:

Variable #	Code 1	Code 2	Code 3
6	0	0	1
7	2	1	2
8	1	0	1
9	1	0	1
10	2	1	2
11	1	1	2
12	0	0	0

These separate codings were regressed on the dependent variables. The results indicated that code 1 was slightly better than code 2 in terms of correlation with the dependent variable. However, the decision was made to adopt code 2 since it was a simpler procedure and made more empirical sense. These variables did not need to be dichotomized since it was possible for a school to check only one of the various categories.

Question 7 was also examined with respect to a regression on the dependent variables. The code which resulted was:

Variable #	Code
14	0
15	2
16	0
17	0
18	2
19	1
20	0

This code was then applied to the responses of each school and the sum was computed. The sum was then dichotomized to align it with the other variables. The particular procedure which was tried was that sums of 2, 3, 4, and 5 received a 1 and sums of 0 and 1 received a zero. Comparison of the zero-order correlations of this dichotomy with those of the original variables of this question (see Table 4) showed that the correlations of variable 18 were higher. Therefore it was decided that the response to variable 18 would be allowed to represent this whole question, and no further dichotomization was needed.

The results (Table 5) from the separate analysis of question 14 showed a strong positive correlation between variables 27 and 28 with dependent variables, while variables 29 and 30 had negative correlations with the dependent variables. The resulting code was:

Variable #	Code
27	1
28	1
29	0
30	0

Several dichotomization points based on a bivariate plot of variable 27 with variable 28 were tried. The final dichotomization of 30% or more receiving a value of 1 was based on this variable's correlation with the dependent variables.

The coding for question 18 followed a similar course. The initial correlations (Table 5) showed that only variables 37, 38, 41, 42 and 43 had consistent positive correlations with the dependent variable. Two possible codes were tried for this question:

Variable #	Code #1	Code #2
34	0	0
35	0	0
36	0	-1
37	1	0
38	1	0
39	0	0
40	0	0
41	1	1
42	1	0
43	1	0
44	0	0
45	0	0

The results of the correlational analysis of these codings resulted in the second code being adopted since it resulted in a fairly strong correlation with the dependent variables.

The last variable to be coded was that of Geographic Region. This variable initially consisted of the zip codes for each school, following a procedure established by Science Research Association (SRA) in their national standardization of the SRA Assessment Survey (1971). As can be seen in Table 6, this resulted in dividing the country into nine regions on the basis of zip code. These nine regions were coded 1-9 and correlated

with the dependent variables. On the basis of these correlations a dichotomy was made such that regions 1, 2, 3, and 4 received a code of 1 and the remaining regions received a code of 0.

A summary of the entire coding process can be found in Table 3 which shows the number of final variables, along with a description of which original variables compose it, and the dichotomy point. These final variables were used as independent variables in the stepwise multiple regression.

Results of the Multiple Regression

Utilizing the coding process described above resulted in 19 dichotomous variables. These variables were used as predictor variables with the SCAT total battery scores at each grade level (3, 4, 5, and 6). Tables 7, 8, 9, and 10 present the zero-order correlation matrices supporting the stepwise multiple regression analysis.

The order in which variables entered the regression equation was remarkably consistent over the four grade levels. Table 11 contains the summary data for all these analyses along with the order in which the variables entered the equation. One of the primary reasons for doing this stepwise regression was to select a smaller subset of important predictor variables. It was felt that the final group of demographic variables should be such that they had contributed significantly to the regression analysis in at least two of the four separate analyses. This left six variables which were:

1. Geographic Region (variable 1)
2. Percentage of students who no longer attend (variable 3)

3. Teacher's approval required for new program (variable 8)
4. Percentage of students who are white (variable 10)
5. Percentage of students who speak a second language (variable 14)
6. Total percentage of professional and white collar parents (variable 15)

Of these six the last accounts by far for the most variance, while variable 10 and variable 1 contribute relatively strongly. (See Table 11 for these results).

These six variables gave us the final set of demographic variables with which a school could be described that were significantly related to achievement. Four new multiple regression equations, one at each grade level, were computed using only these six variables as independent variables.

Computing the Profiles

Using the dichotomous values of the six variables, 64 possible profile types were created. In order to derive the differentiated norms, it was necessary to obtain an achievement score for each profile type. This was done by employing the regression equations which were derived from the last regression analysis. The actual equations can be found in Table 11. Applying the regression weights and the addition constant to the binary values constituting the profiles gave predicted scores for each profile type. This value represented the average value expected for schools within that profile, even though for some profiles there were no schools present in the actual data and in some cases only a few schools present. The results of this regression, the predicted mean score for each profile, can be found in Table 12.

It will be recalled that the aim of the study was not just to find a set of demographic variables with which to classify a school, but to provide a means of adjusting the published norms on the basis of these variables. To accomplish this, it was necessary to find the distance between the predicted mean of the profiles and the mean of the population. This distance could then be converted to an area under the normal curve so that it could be applied to results from any standardized test.

In Table 12, each profile is shown with its predicted value; in the next column can be found this value's Z-score equivalent (found by using the mean of the entire norming sample and the between schools standard deviation, found in Table 13). By using this Z-score, it was possible to find the difference in terms of percentiles between the predicted mean of the profile and the mean of the norming group. It is this difference which should be employed to realign a school's test results with those of the published norms. The particular correction values for each profile type can be found in the last column of Table 12.

A Partial Validation

Even though the above system seems sound in theory, it should be noted that the peculiarities of the norming sample influence our corrections for differentiation in several ways. The most crucial of these is the effect of subtracting the mean of the norming group as if it were the population mean. Because of this weakness and the fear that the obtained correction factors might be specific to the particular group of schools and the achievement test used, a validation analysis was undertaken.

The data for this validation analysis was supplied by the CTB/McGraw-Hill.[3] As with the data from ETS, achievement scores from a CTB standardized

[3]Special thanks are extended to Dr. Donald Green, Director of Research, CTB/McGraw-Hill, for his cooperation in supplying this data.

test and demographic data from the SCQ were used. The achievement test that was used in this case was the Comprehensive Test of Basic Skills (CTBS). Although CTB/McGraw-Hill had sent the SCQ out to all their participating schools, there was only a small return, so that the final sample size at each grade level was fairly small. However it seemed that there was enough data to supply at least a partial validation of the previously determined correction factors for the 64 profiles.

The procedure which was followed in this case was first to code the results from each school in terms of profile type to which they belonged. Then their achievement mean scores were turned into Z-scores by using the published mean scores and the between schools standard deviations. The actual values used can be found in Table 14. After this had been done for all the schools at all the grade levels, the average Z-score value was found for each profile at the various grades. With this average Z-score value, the difference from the population mean in terms of percentiles could be found for each profile. These percentile values were then compared with the percentile values obtained from ETS data. Table 15 reports the differences between these two percentile values.

Although there are some rather large discrepancies present here, these usually occurred where there were only a few cases present in that profile. On the whole, there seems to be a fairly good correspondence on the size of percentile corrections at the various profiles between the two sets of data. It should be realized that these data are still weak and do not supply a good test of the original findings or procedure. Hopefully, in the not too distant future, more reliable data will be available for this purpose.

Development of School Norm Estimations

As was mentioned previously, CSE was interested not only in the problem of developing differentiated norms but also in developing a procedure for converting the individual student norms supplied by most test publishers to school norms. These norms are essential for evaluating programs and are necessary for proper use of the differentiated norms just discussed.

The primary difference between school norms and student norms is in terms of variability. The scores from individual students will be much more variable than the scores from schools or even classroom scores. Therefore, if one could get a fairly reliable estimate of the ratio of the variability of student scores to school scores, one could then correct individual norms to norms which would be more appropriate for use with school scores. This scheme was pursued by CSE and the results can be found in Table 16.

The values of Table 16 were determined by successive averaging of ratios supplied in the technical manuals of the Iowa Tests of Basic Skills, Cooperative School and College Ability Tests, and Cooperative Sequential Test of Educational Progress. These ratios were determined not only for the various grade levels but also for the goal areas which are employed by CSE Elementary School Evaluation KIT: Needs Assessment. With these ratios it is now possible to get a reasonable estimate of one's school percentile score while having only the norm table for individuals supplied by the test manual. (The actual procedure for this will be more fully explained below.)

Utilization of Differentiated School Norms in the KIT

It was mentioned previously that the Elementary School Evaluation KIT: Needs Assessment provides a step-by-step procedure for the educational decision maker that would result in a priority ordering of 106 different educational goals. These goals having been ordered, the KIT then assists in the selection of tests to be employed as measures of achievement in the most important goal areas. Following collection of the test results, the KIT then assists the educator in interpreting these test results so a decision can be made regarding the success of programs in the goal areas. It is at this point that the differentiated norms and estimated school norms are utilized with the KIT.

The procedure that is followed is, first, to estimate the school normed score from the individual normed score, and then to apply the appropriate differentiated correction to this value. The procedure is presented step-by-step below:

[Start with step 1 if your test manual provides student norms; start with step 5 if your test manual provides school or classroom norms]:

1. Compute the mean (average) score for your school, grade, or classroom to be evaluated. This is the mean raw score for the test chosen to assess the goal area.

2. Momentarily, pretend this mean is a pupil's raw score, and, through use of the appropriate published pupil norm table (in the test manual), determine the corresponding percentile score. (This percentile score will usually be near to the 50th percentile, an error of underestimation from the average.) We can call this the School Percentile Score.

3. Obtain the Deviation Ratio for the goal area and grade level of the test under consideration from Table 16. This value is an estimate of the ratio of the standard deviation based upon pupil raw scores. It will change your standing to a percentile farther away from the 50th percentile; a correction for the school mean.

4. Enter the row of Table 17 that corresponds (most closely) to the School Percentile Score obtained in step 2 and enter the column that corresponds to the Deviation Ratio obtained in step 3. Where the row and column intersect, the estimated value of the school's or classroom's percentile score can be found. This is an estimation of your classroom's or school's standing on a school norm. It is called the School Norm.

5. Determine the Differentiated Profile to which your school belongs by completing the six questions in Table 18.

6. Using your school's Differentiated Profile, enter Table 12 to find the correction factor. Add or subtract (according to the sign in the table) this factor to your School Norm as found in Step 4 (or as determined in school norms provided in the test manual).

The resulting percentile score is your differentiated school norm score. This score takes into account the fact that the score is from a school and not an individual and also accounts for the type of school involved. For the purposes of the KIT, this score reflects as closely as possible the true performance of the school in a particular goal area.

Now let's look at a fictitious example of the implemented procedure as described in Booklet IV of the Needs Assessment KIT.

> Mr. Knox, principal of Simon Bolivar Elementary School in the "barrio" of Los Angeles, has just administered the Reading-Word Knowledge scale (Goal area 30A, Recognition of Word Meanings) of the Metropolitan Achievement Tests (Harcourt, Brace, Jovanovich) to his two third-grade classrooms. Since the District provides machine scoring services to the schools, Mr. Knox did not have to compute the mean score for the 67 children; the mean raw score was reported to him by the district to be 11.971 [STEP 1]. Knox rounded this score to 12.0, which he converted to a standard score (a conversion system unique to the Metropolitan) of 35. This, in turn, he converted to a centile score of 30 [STEP 2].
>
> Referring to Table 1,* under grade 3 and goal area 30 (of which 30A is a sub-goal), Knox found the deviation ratio to be .46 [STEP 3]. In order to obtain his school norm score (an estimate of the centile placement of a raw score of 12 on a school mean score distribution) he then went to Table 2 and found the intersection of the row "30 percentile" and column ".46 deviation ratio" to be 13 [STEP 4]. This means that Knox's school mean score,

*Table 1 in this example refers to Table 16 of this report, Table 2 refers to Table 17, Table 3 refers to Table 18, and Table 4 refers to Table 12.

in comparison to other school mean scores, is very low. But Knox still has to take into account his differentiated type of school.

Knox then filled out his school's differentiated profile (Table 3) and found it to be 000101 [STEP 5]. In Table 4 he found the third-grade correction factor for his differentiated profile to be +22. He then added this factor to his school percentile score of 13 [STEP 6]; the result being 35. With a differentiated school norm score at the 35 percentile, Knox confidently concluded that his students and school were not achieving very well in the reading skill of recognizing word meanings.

Summary

The problem of evaluating the progress of a school and its programs has been recently the topic of a great deal of research and discussion. The Center for the Study of Evaluation has confronted this problem and produced the CSE Elementary School Evaluation KIT: Needs Assessment as a partial solution. Within the framework of the KIT, the need for school norms and for accounting for various demographic differences between schools arose.

By using a multiple regression approach, six demographic variables were singled out as being important predictors of achievement on a standardized test (the SCAT). Using these variables to create 64 school types, percentile correction factors were determined by once again using the regression technique.

The problem of converting a school score to a school percentile when one only had a norm table for individuals was also studied. A procedure for converting a percentile score from an individual's norm table to a school percentile was outlined. This procedure was based on successive averages of the ratios of variability between school scores and individual scores as reported in the technical manual of these tests.

Lastly, it was pointed out that both of these procedures can aid the educational decision maker, as in the Elementary School Evaluation KIT: Needs Assessment.

References

Coleman, J. S., et al. Equality of education opportunity. Washington; U.S. Government Printing Office, 1966.

Flanagan, J. C., Dailey, J. T., Shaycoft, M. F., Orr, D. B., and Goldbert, I. Studies of the American high school. (Final report to the U.S. Office of Education, Cooperative Research Project No. 226.) Washington, D. C.; Project TALENT Office, University of Pittsburgh, 1962.

Hoepfner, R., Klein, S., Bradley, P. A., and Alkin, M. C. Elementary school evaluation KIT: Needs assessment. Los Angeles: Center for the Study of Evaluation, 1970.

Hoepfner, R., Strickland, G., Stangel, G., Jansen, P. and Patalino, M. CSE elementary school test evaluations. Los Angeles: Center for the Study of Evaluation, 1970.

Science Research Associates. The national standardization of the SRA assessment survey. Chicago: Author, Spring 1971.

Table 1

Number of School Units Analyzed at Each Grade Level

Grade	Number of Units
3	217
4	215
5	211
6	211

Table 2

Description of Original Variables Before Coding

Variable #	Description
1	Geographic Region - Zip Code of School
2	Number of students in Particular Grade
3	Response to Question 2 of SCQ
4	Response to Question 3 of SCQ
5	Response to Question 4 of SCQ
6	Response to 5 a
7	Response to 5 b
8	Response to 5 c
9	Response to 5 d
10	Response to 5 e
11	Response to 5 f
12	Response to 5 g
13	Response to Question 6
14	Response to Board of Education - Question 7
15	Response to Superintendent - Question 7
16	Response to District Administrator - Question 7
17	Response to Parents - Question 7
18	Response to Teachers - Question 7
19	Response to No Formal - Question 7
20	Total Number checked on Question 7
21	Response to Question 8
22	Response to Question 9
23	Response to Question 10

Table 2 (Continued)

Variable #	Description
24	Response to Question 11
25	Response to Question 12
26	Response to Question 13
27	Percentage Professional Managers - Question 14
28	Percentage White Collar - Question 14
29	Percentage Skilled Worker - Question 14
30	Percentage Unskilled Worker - Question 14
31	Response to Question 15
32	Response to Question 16
33	Response to Question 17
34	Response to Guidance Counselor - Question 18
35	Response to Psychologist - Question 18
36	Response to Child Welfare - Question 18
37	Response to Nurse - Question 18
38	Response to Speech Therapist - Question 18
39	Response to Remedial Reading - Question 18
40	Response to English-Second-Language - Question 18
41	Response to Art Teacher - Question 18
42	Response to Music Teacher - Question 18
43	Response to Sex Education - Question 18
44	Response to Librarian - Question 18
45	Response to Teacher Aides - Question 18
46	Total Number of Hours in Question 18

Table 3

List of Final Variables Resulting from Coding Process

Final Variable #	Description	Dichotomization Point
1	Geographic region - Coded 1-9	≤ 4=1
2	Number of students in a grade	≤80=1
3	Percentage of students who no longer attended	≤ 4=1
4	Age of main classroom building	≤20=1
5	Percentage of families represented at PTA meeting	≥20=1
6	Neighborhood served by school	1=1
7	Percentage of students whose mother works	≤33 1/3=1
8	Teacher's approval required for new program	1=1
9	Copyright date of 3rd grade reader	≥66=1
10	Percentage of students who are white	≥90=1
11	Starting annual salary of teachers	≥60=1
12	Percentage of 1st graders who went to Kindergarten	≥85=1
13	Percentage of students who have only 1 parent	≤10=1
14	Percentage of students who speak 2nd language	≤ 2=1
15	Total percentage of professional and white collar workers	≥30=1
16	Number of catalogued volumes in library	≥50=1
17	Average experience of full-time teacher	≤10=1
18	Average salary of teaching staff	≥80=1
19	Difference in hours between Child Welfare Officer and Art Teacher	≥ 7=1

Table 4

Correlation Matrix of Question #5 Responses with SCAT Total Score

Variable #	6	7	8	9	10	11	12	49
6	1.000	-.273	-.070	.025	-.171	-.219	-.105	-.129
7		1.000	-.102	-.211	-.338	-.294	-.153	.236
8			1.000	-.049	-.079	-.074	-.035	-.040
9				1.000	-.163	-.154	-.074	-.099
10					1.000	-.247	-.118	.070
11						1.000	-.112	-.058
12							1.000	-.129
49								1.000

Correlation Matrix of Question #7 Responses with SCAT Total Score

Variable #	14	15	16	17	18	19	20	49
14	1.000	.346	-.041	.161	.135	-.298	.629	-.018
15		1.000	-.083	.086	.100	-.503	.543	.056
16			1.000	.113	.164	-.140	.447	-.053
17				1.000	.450	-.037	.539	.057
18					1.000	-.088	.617	.201
19						1.000	-.413	.029
20							1.000	.074
49								1.000

Table 5

Correlation Matrix of Question #14 Responses with SCAT Total Score

Variable #	27	28	29	30	49
27	1.000	.201	-.573	-.418	.378
28		1.000	-.417	-.426	.318
29			1.000	-.122	-.304
30				1.000	-.326
49					1.000

Correlation Matrix of Question #18 Responses with SCAT Total Score

Variable #	34	35	36	37	38	39	40	41	42	43	44	45	49
34	1.000	.068	.097	.170	.077	.025	.122	.023	.127	.241	.241	.161	-.063
35		1.000	.119	-.008	.190	.178	-.016	.288	.277	-.032	.098	.016	-.002
36			1.000	.119	.089	-.037	-.003	.143	.138	-.053	.140	.142	-.165
37				1.000	.225	.168	-.002	.332	.276	.002	.191	.089	.039
38					1.000	.171	-.022	.278	.415	.038	.142	.278	.010
39						1.000	-.013	.143	.208	-.120	.248	.125	-.062
40							1.000	.074	.128	.434	.159	.234	-.027
41								1.000	.659	.176	.228	.305	.150
42									1.000	.127	.269	.252	.040
43										1.000	.016	.373	.027
44											1.000	.239	-.063
45												1.000	-.027
49													1.000

Table 6

Codes for Regroups of the United States and Field Test Sample

Regions	First Three Digits of Zip Code	Code
New England *Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut*	010-069	1
Middle Atlantic *New York, New Jersey, Pennsylvania*	070-196	2
East North Central *Ohio, Indiana, Illinois, Michigan, Wisconsin*	430-499, 530-549, 600-629	3
West North Central *Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, Kansas*	500-528, 550-588, 630-693	4
South Atlantic *Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida*	197-339	5
East South Central *Kentucky, Tennessee, Alabama, Mississippi*	350-427	6
West South Central *Arkansas, Louisiana, Oklahoma, Texas*	700-799	7
Mountain *Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, Nevada*	590-599, 800-898	8
Pacific *Washington, Oregon, California, Alaska, Hawaii*	900-999	9

Table 7

Correlation Matrix of 19 Final Variables and SCAT Total Score for Grade Three

Var.#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	(SCAT) 20
1	1.000	.021	.255	.086	-.145	.070	-.112	-.040	-.114	.133	.167	.433	-.172	-.011	-.003	-.067	-.075	.251	.483	.231
2		1.000	.037	.053	-.115	.196	-.059	-.053	.032	-.083	.157	-.096	.006	.029	-.007	.097	-.155	.096	.006	-.029
3			1.000	-.066	.007	-.145	-.041	-.020	-.037	.130	.082	.029	-.157	.139	-.001	.028	.071	.026	.105	.147
4				1.000	.033	-.130	.205	.063	.059	-.042	-.144	-.161	.023	.053	-.091	-.045	.188	-.083	.002	.021
5					1.000	.163	.002	.035	-.033	.054	-.069	-.080	-.084	.065	.275	.049	-.025	-.182	-.086	.206
6						1.000	-.031	.053	.080	.102	.077	.122	-.100	.050	.374	.113	-.193	.050	.185	.245
7							1.000	-.030	.059	-.175	-.166	-.168	.326	-.082	-.084	-.005	.101	-.186	-.100	-.109
8								1.000	.030	.121	.107	.063	-.052	.140	.117	-.057	-.012	.029	-.135	.201
9									1.000	-.142	.005	-.116	.050	-.092	.044	.161	-.087	-.003	-.006	-.045
10										1.000	.166	.134	-.222	.106	.206	-.012	.037	.065	.063	.270
11											1.000	.187	.088	.077	.149	.162	-.047	.517	.149	.145
12												1.000	-.087	-.041	.187	.012	-.215	.277	.247	.233
13													1.000	-.152	-.106	.003	.060	.070	-.226	-.227
14														1.000	-.005	.134	.026	.031	-.057	.100
15															1.000	.222	-.105	.128	.195	.436
16																1.000	-.076	.138	.151	.161
17																	1.000	-.057	-.143	-.080
18																		1.000	.185	.031
19																			1.000	.249
20																				1.000

Table 8

Correlation Matrix of 19 Final Variables and SCAT Total Score for Grade Four

Var. #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	(SCAT) 20
1	1.000	.089	.274	.135	-.136	.079	-.083	-.044	-.160	.159	.242	.422	-.174	-.033	.032	-.044	-.060	.271	.448	.179
2		1.000	.013	.032	-.070	.205	-.107	-.055	.023	-.104	.209	-.071	.004	-.013	.072	.237	-.117	.100	.089	.093
3			1.000	-.006	.021	-.113	-.027	-.046	-.003	.179	.044	.060	-.191	.126	-.056	-.001	.057	.010	.111	.152
4				1.000	-.021	-.121	.150	.006	.021	-.121	-.157	-.127	.016	.007	-.085	-.078	.141	-.076	.040	-.086
5					1.000	.172	-.028	.011	.011	.055	-.138	-.037	-.088	.066	.211	.025	-.056	-.179	-.085	.187
6						1.000	-.043	.063	.068	.091	.133	.139	-.087	.054	.391	.138	-.185	.102	.171	.315
7							1.000	-.054	.068	-.196	-.213	-.145	.327	-.083	-.137	-.051	.126	-.185	-.098	-.077
8								.1000	.074	.161	.109	.074	-.035	.092	.079	-.064	-.050	.015	-.140	.076
9									1.000	-.119	.054	-.151	.049	-.030	.049	.173	-.103	.001	-.000	-.094
10										1.000	.080	.145	-.216	.154	.132	-.049	-.015	.012	.134	.323
11											1.000	.268	.003	-.020	.162	.124	-.109	.515	.185	.095
12												1.000	-.115	-.038	.207	.040	-.221	.298	.208	.212
13													1.000	-.170	-.112	.006	.133	.011	-.255	-.195
14														1.000	-.098	.040	-.001	-.060	-.037	.124
15															1.000	.201	-.150	.126	.234	.385
16																1.000	-.101	.153	.167	.073
17																	1.000	-.043	-.151	-.024
18																		1.000	.185	.020
19																			1.000	.194
20																				1.000

Table 9

Correlation Matrix of 19 Variables and SCAT Total Score for Grade Five

Var.#	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	(SCAT) 20
1	1.000	.081	.234	.070	-.107	.112	-.134	.010	-.190	.227	.242	.435	-.141	-.052	.085	-.055	-.037	.282	.414	.307
2		1.000	.023	-.081	-.062	.241	-.128	-.008	-.015	-.071	.221	-.120	-.005	-.036	.093	.204	-.110	.091	.100	.166
3			1.000	-.042	.038	-.065	-.039	-.042	-.064	.190	.022	.067	-.253	.104	.001	-.045	.038	-.020	.149	.173
4				1.000	-.026	-.124	.171	.001	.036	.016	-.181	-.119	.025	.041	-.081	-.097	.175	-.126	.046	-.062
5					1.000	.148	-.034	.047	.041	-.013	-.094	-.038	-.083	.019	.252	.072	-.107	-.116	-.095	.037
6						1.000	-.053	.047	.139	.061	.110	.102	-.071	.033	.381	.163	-.209	.122	.162	.286
7							1.000	-.026	.125	-.143	-.227	-.158	.210	-.063	-.159	-.069	.080	-.237	-.033	-.147
8								1.000	.029	.057	.121	.019	-.032	.021	.120	.014	-.101	.095	-.141	.084
9									1.000	-.084	.023	-.096	.056	-.052	.097	.159	-.032	-.024	-.017	-.044
10										1.000	.103	.191	-.227	.197	.086	-.028	.084	.045	.191	.305
11											1.000	.272	.042	.605	.165	.123	-.075	.504	.165	.157
12												1.000	-.084	.031	.126	.007	-.110	.319	.181	.262
13													1.000	-.211	-.124	.055	.056	.006	-.221	-.170
14														1.000	-.092	.030	-.074	-.024	.047	.138
15															1.000	.221	-.165	.183	.236	.398
16																1.000	-.154	.125	.145	.119
17																	1.000	-.035	-.076	-.116
18																		1.000	.182	.158
19																			1.000	.199
20																				1.000

Table 10

Correlation Matrix of 19 Variables and SCAT Total Score for Grade Six

Var. #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	(SCAT) 20
1	1.000	.096	.239	.085	-.099	.076	-.202	-.035	-.188	.237	.282	.385	-.159	-.016	.032	-.033	-.074	.303	.337	.260
2		1.000	.031	-.087	.116	.195	-.206	-.047	-.058	-.031	.201	-.094	.016	.031	.143	.288	-.169	.115	.089	.001
3			1.000	-.004	.007	-.119	-.035	-.061	-.063	.187	.031	.016	-.260	.108	-.047	-.011	.012	-.011	.090	.214
4				1.000	-.003	-.149	.132	-.059	.050	-.021	-.186	-.053	-.001	.044	-.092	-.114	.174	-.087	.074	-.048
5					1.000	.185	.008	.024	.003	.031	-.112	-.025	-.067	-.037	.287	.048	-.008	-.175	-.070	.088
6						1.000	-.106	.025	.027	.073	.092	.114	-.069	.002	.405	.110	-.144	.130	.131	.230
7							1.000	-.046	.068	-.121	-.230	-.162	.178	-.072	-.122	-.083	.030	-.184	-.093	-.095
8								1.000	.013	.065	.142	.009	-.031	.039	.072	.009	-.112	.088	-.151	.159
9									1.000	-.141	-.004	-.039	.044	-.050	-.012	.109	.054	-.012	-.024	-.098
10										1.000	.110	.193	-.269	.191	.138	.007	-.031	.103	.163	.322
11											1.000	.237	.082	.053	.121	.125	-.119	.502	.148	.091
12												1.000	-.065	.027	.041	-.049	.025	.211	.211	.201
13													1.000	-.199	-.108	.066	.029	.015	-.202	-.194
14														1.000	-.119	.047	-.114	-.004	.086	.128
15															1.000	.205	-.170	.107	.192	.415
16																1.000	-.124	.120	.124	.045
17																	1.000	-.037	-.066	-.153
18																		1.000	.146	.129
19																			1.000	.188
20																				1.000

Table 11

Regression Weights and Proportion of Variance for Final Six Variables

	Grade 3		Grade 4		Grade 5		Grade 6	
Variable #	b	R^2	b	R^2	b	R^2	b	R^2
1	1.36209	.0436	1.07103	.0157	2.81284	.0482	2.29709	.0360
3	0.50670	.0058	0.85350	.0090	0.93269	.0064	2.00196	.0223
8	1.16289	.0187	0.11009	.0001	0.39713	.0007	1.91986	.0166
10	1.05143	.0338	2.52952	.0752	2.69472	.0737	2.59841	.0712
14	0.46047	.0061	1.27250	.0132	2.02520	.0187	1.82957	.0161
15	2.65726	.1902	3.54041	.1483	4.74750	.1583	5.22509	.1723
Additive Constant =	246.84853		250.18968		253.99202		259.23291	

Table 12

Correction Factors to Add (+) or Subtract (-) to Obtain Differentiated School Norms

Differentiated Profile	First Grade*	Third Grade	Fifth Grade	Sixth Grade
000000	+39	+36	+39	+41
000001	+33	+27	+37	+35
000010	+33	+33	+31	+35
000011	+26	+22	+29	+27
000100	+34	+32	+36	+34
000101	+27	+22	+34	+26
000110	+27	+28	+27	+27
000111	+19	+16	+25	+16
001000	+29	+25	+28	+33
001001	+21	+12	+25	+25
001010	+21	+20	+17	+25
001011	+12	+06	+14	+15
001100	+22	+19	+23	+24
001101	+14	+06	+21	+14
001110	+13	+14	+11	+14
001111	+04	00	+09	+02
010000	+29	+28	+28	+32
010001	+22	+16	+26	+23
010010	+21	+23	+17	+24
010011	+13	+10	+15	+13
010100	+23	+23	+23	+23
010101	+14	+09	+21	+12
010110	+14	+18	+12	+12
010111	+05	+04	+09	+01
011000	+16	+13	+13	+21
011001	+06	-01	+10	+10
011010	+06	+08	00	+11
011011	-03	-07	-02	-01
011100	+08	+07	+07	+10
011101	-02	-07	+04	-02
011110	-02	+02	-06	-02
011111	-11	-13	-08	-13
100000	+15	+10	+17	+19
100001	+06	-04	+15	+08
100010	+06	+05	+05	+09
100011	+04	-10	+02	-03
100100	+08	+04	+12	+08
100101	-02	-10	+09	-04
100110	-02	-02	-01	-04
100111	-11	-16	-03	-15

*First Grade correction factors are estimates; averages from grades three, five, and six.

Table 12 (Continued)

Differentiated Profile	First Grade*	Third Grade	Fifth Grade	Sixth Grade
101000	00	-06	00	+06
101001	-10	-20	-03	-06
101010	-10	-12	-13	-06
101011	-19	-25	-15	-17
101100	-08	-13	-06	-07
101101	-17	-25	-09	-18
101110	-18	-18	-18	-17
101111	-26	-30	-21	-27
110000	+01	-03	+01	+04
110001	-09	-17	-02	-08
110010	-09	-08	-12	-07
110011	-18	-22	-14	-19
110100	-07	-09	-05	-08
110101	-17	-22	-08	-20
110110	-17	-14	-17	-19
110111	-25	-27	-20	-29
111000	-15	-19	-17	-10
111001	-23	-30	-19	-21
111010	-24	-24	-27	-21
111011	-31	-34	-29	-30
111100	-23	-24	-22	-22
111101	-30	-34	-24	-31
111111	-36	-37	-33	-38

*First Grade correction factors are estimates; averages from grades three, five, and six.

Table 13

Individual and School Means and Standard Deviations For the SCAT

		Grade 3	Grade 4	Grade 5	Grade 6
Individual Student					
Mean:	Verbal	241.8000	248.7345	254.8044	260.9343
	Math	249.8281	256.4072	263.4368	271.4523
	Total	250.3425	255.7669	261.5400	267.6915
SD:	Verbal	10.1639	12.1162	13.8671	14.5464
	Math	7.4713	10.1805	13.2120	15.4882
	Total	6.0593	8.5687	11.2593	12.2945
School					
SD:	Verbal	5.2201	6.2904	7.2478	7.2036
	Math	3.6580	5.0432	6.9926	7.6283
	Total	3.2108	4.5504	6.2408	6.3915

NOTE: School means are the same as the Individual Student Means

Table 14

Individual and School Means and Estimated* School Standard Deviations for CTBS

	Grade					
	3	4		5	6	
Level	1	1	2	2	2	3
Individual						
Mean:	175.95	214.64	149.27	178.83	200.72	147.45
School						
Mean:	175.95	214.64	149.27	178.83	200.72	147.45
Standard Deviation:	28.51	29.72	24.16	26.55	26.52	24.21

* Estimated at each level from data supplied by CTB/McGraw - Hill. Unfortunately the sample size at these levels was rather small, varying from approximately 40 to 90 schools at any one level.

Table 15

Differences in CTB and ETS Percentile Corrections for Each Profile

Profile	Grade 3	4	5	6
000000	.06 (3)	.00 (4)	.09 (1)	—.04 (3)
000001	.22 (1)	.11 (1)	.12 (1)	.14 (1)
000010	—.02 (3)	.00 (1)	.06 (9)	.01 (11)
000011	—.10 (2)	—.43 (3)	—.45 (2)	—.19 (2)
000100	—.02 (1)	.10 ((1)	—.17 (1)	—.10 (1)
000101				
000110	—.22 (1)	.22 (2)	.20 (1)	.22 (2)
000111				
001000				
001001	—	—.47 (1)	—.46 (1)	—.45 (1)
001010	—.05 (2)	—.01 (2)		.13 (1)
001011				
001100				
001101				
001110				
001111				
010000				
010001	.23 (1)	.22 (1)		.21 (1)
010010	.25 (1)	.15 (2)	.09 (2)	.12 (1)
010011	.07 (1)	—.16 (1)		
010100				
010101				
010110	.17 (4)	.19 (5)	.10 (3)	.20 (4)

*Numbers in parantheses indicate number of schools in CTB data.

(Table 15 continued)

Profile	3	4	5	6
010111	.32 (1)	.42 (1)	.21 (1)	
011000	− .02 (2)	− .06 (2)	− .09 (1)	− .32 (2)
011001				
011010	− .005 (5)	− .02 (7)	.01 (2)	− .31 (7)
011011	.00 (2)	− .25 (6)	.07 (3)	− .13 (5)
011100				
011101				
011110	− .27 (1)			
011111	.14 (2)	− .07 (2)	− .10 (1)	+ .06 (1)
100000				
100001				
100010	.17 (1)	− .16 (3)	− .01 (3)	− .11 (2)
100011		.26 (1)	.07 (1)	− .03 (1)
100100				
100101				
100110		− .18 (1)	− .25 (1)	− .22 (1)
100111				
101000		− .31 (1)	.03 (1)	
101001	.22 (2)	− .13 (3)	− .36 (1)	− .24 (1)
101010	− .29 (1)	− .10 (2)	+ .43 (1)	− .04 (2)
101011	.00 (2)	− .18 (2)	+ .20 (1)	.09 (1)
101100				
101101				
101110	.28 (1)	− .17 (2)		− .10 (1)
101111				
110000	.15 (2)	+ .10 (3)	− .22 (2)	− .17 (2)
110001	.24 (3)	− .07 (3)	− .07 (3)	

(Table 15 continued)

Profile	3	4	5	6
110010	− .13 (10)	.04 (13)	− .12 (8)	− .04 (7)
110011	.04 (6)	− .12 (4)	− .14 (4)	− .12 (1)
110100		− .19 (1)	− .25 (1)	− .20 (1)
110101				
110110	.08 (2)	+ .52 (1)	− .02 (2)	.44 (2)
110111	− .18 (1)	− .13 (1)	− .21 (1)	- .09 (1)
111000	.00 (4)	− .10 (6)	− .11 (3)	− .17 (5)
111001	.08 (1)	− .01 (2)	− .12 (1)	− .01 (2)
111010	− .07 (7)	+ .03 (6)	+ .08 (4)	+ .07 (9)
111011	.19 (1)	+ .13 (4)	− .07 (2)	+ .05 (4)
111100	.37 (1)	− .02 (4)	+ .32 (1)	− .04 (1)
111101				
111110	− .07 (2)	− .07 (2)	− .04 (1)	− .10 (2)
111111		− .03 (2)	+ .07 (2)	+ .06 (1)
Total Difference	10.48(80)	11.93(106)	12.38(73)	12.67(90)
Average Difference	.131	.112	.16	.14

Table 16

Estimated Deviation Ratios for Four Grade Levels and Forty-One Goal Areas

	Gr. 1	Gr. 3	Gr. 5	Gr. 6
1. Temperament - Personal	.47	.46	.44	.54
2. Temperament - Social	.47	.46	.44	.54
3. Attitudes	.47	.46	.44	.54
4. Needs and Interests	.47	.46	.44	.54
5. Valuing Arts and Crafts	.47	.46	.44	.54
6. Producing Arts and Crafts	.47	.46	.44	.54
7. Understanding Arts and Crafts	.47	.46	.44	.54
8. Reasoning	.48	.48	.45	.58
9. Creativity	.48	.48	.45	.58
10. Memory	.48	.48	.45	.58
11. Foreign Language Skills	.47	.46	.44	.54
12. Foreign Language Assimilation	.47	.46	.44	.54
13. Language Construction	.46	.45	.47	.47
14. Reference Skills	.48	.44	.50	.52
15. Arithmetic Concepts	.51	.49	.51	.53
16. Arithmetic Operations	.51	.47	.55	.53
17. Mathematical Applications	.44	.41	.41	.53
18. Geometry	.48	.47	.49	.52
19. Measurement	.47	.48	.47	.48
20. Music Appreciation and Interest	.47	.46	.44	.54
21. Music Performance	.47	.46	.44	.54
22. Music Understanding	.47	.46	.44	.54
23. Health and Safety	.47	.46	.44	.54
24. Physical Skills	.47	.46	.44	.54
25. Sportsmanship	.47	.46	.44	.54
26. Physical Education	.47	.46	.44	.54
27. Oral-Aural Skills	.47	.46	.42	.56
28. Word Recognition	.47	.46	.42	.56
29. Reading Mechanics	.47	.46	.42	.56
30. Reading Comprehension	.48	.46	.47	.52
31. Reading Interpretation	.46	.45	.38	.60
32. Reading Appreciation and Response	.47	.46	.42	.56
33. Religious Knowledge	.47	.46	.44	.54
34. Religious Belief	.47	.46	.44	.54
35. Scientific Processes	.44	.45	.38	.49
36. Scientific Knowledge	.44	.45	.38	.49
37. Scientific Approach	.44	.45	.38	.49
38. History and Civics	.47	.44	.43	.57
39. Geography	.47	.44	.43	.57
40. Sociology	.46	.45	.37	.63
41. Application of Social Studies	.48	.42	.49	.51

Table 17

School Norm Estimated from Percentile Mean Pupil Score and Deviation Ratio for Goal Area

Individual Percentile	Deviation Ratio 37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
08	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01
09	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	01	02
10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	01	02	02	02	02
11	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	02	02	02	02	02	02	02
12	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	02	02	02	02	02	02	03	03
13	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	01	01	02	02	02	02	02	03	03	03	03	03
14	00	00	00	00	00	00	00	00	00	00	00	00	01	01	02	02	02	02	02	02	03	03	03	03	04	04	04
15	00	00	00	00	00	00	00	00	00	00	01	01	02	02	02	02	02	03	03	03	03	04	04	04	04	05	05
16	00	00	00	00	00	00	00	01	01	01	02	02	02	02	02	03	03	03	03	04	04	04	05	05	05	05	06
17	00	00	00	00	00	01	01	02	02	02	02	02	03	03	03	03	04	04	04	04	05	05	05	06	06	06	07
18	00	00	00	01	01	02	02	02	02	03	03	03	03	04	04	04	04	05	05	05	06	06	06	07	07	07	08
20	01	01	01	02	02	02	02	03	03	03	04	04	04	04	05	05	05	06	06	06	07	07	07	08	08	09	09
21	02	02	02	02	03	03	03	03	04	04	04	05	05	05	06	06	07	07	07	08	08	08	09	09	09	10	10
23	02	02	03	03	03	04	04	04	05	05	06	06	06	07	07	07	08	08	09	09	09	10	10	11	11	11	12
24	03	03	04	04	04	05	05	06	06	06	07	07	08	08	08	09	09	10	10	11	11	11	12	12	13	13	13
26	04	04	05	05	06	06	07	07	07	08	08	09	09	10	10	11	11	11	12	12	13	13	14	14	14	15	15
27	05	06	06	07	07	08	08	09	09	10	10	11	11	12	12	12	13	13	14	14	15	15	15	16	16	17	17
29	07	07	08	08	09	10	10	11	11	12	12	13	13	14	14	15	15	15	16	16	17	17	18	18	18	19	19
31	09	09	10	11	11	12	12	13	13	14	14	15	16	16	16	17	17	18	18	19	19	19	20	20	21	21	21
33	11	12	12	13	14	14	15	15	16	16	17	18	18	18	19	19	20	20	21	21	22	22	22	23	23	23	24
34	14	15	15	16	16	17	18	18	19	19	20	21	21	21	22	22	23	23	23	24	24	25	25	25	26	26	26
36	17	18	18	19	20	20	21	22	22	22	23	23	24	24	25	25	25	26	26	27	27	27	28	28	28	29	29
38	21	22	22	23	23	24	24	25	25	26	26	27	27	27	28	28	29	29	29	30	30	30	31	31	31	31	32
40	25	26	26	27	27	28	28	28	29	29	30	30	30	31	31	32	32	32	32	33	33	33	34	34	34	34	35
42	29	30	30	31	31	32	32	32	33	33	33	34	34	34	35	35	35	36	36	36	36	36	37	37	37	37	38
44	34	35	35	35	36	36	36	37	37	37	37	38	38	38	38	39	39	39	39	39	40	40	40	40	40	40	41
46	39	40	40	40	40	41	41	41	41	41	42	42	42	42	42	42	43	43	43	43	43	43	43	43	43	44	44
48	45	45	45	45	45	45	45	45	46	46	46	46	46	46	46	46	46	46	46	46	46	47	47	47	47	47	47
50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
52	55	55	55	55	55	55	55	55	54	54	54	54	54	54	54	54	54	54	54	54	54	53	53	53	53	53	53
54	61	60	60	60	60	59	59	59	59	59	58	58	58	58	58	58	57	57	57	57	57	57	57	57	57	56	56
56	66	65	65	65	64	64	64	63	63	63	63	62	62	62	62	61	61	61	61	61	60	60	60	60	60	60	59

Table 17 (continued)

School Norm Estimated from Percentile Mean Pupil Score and Deviation Ratio for Goal Area

Individual Percentile	Deviation Ratio 37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
58	71	70	70	69	69	68	68	68	67	67	67	66	66	66	65	65	65	64	64	64	64	64	63	63	63	63	62
60	75	74	74	73	73	72	72	72	71	71	70	70	70	69	69	68	68	68	68	67	67	67	66	66	66	66	65
62	79	78	78	77	77	76	76	75	75	74	74	73	73	73	72	72	71	71	71	70	70	70	69	69	69	69	68
64	83	82	82	81	80	80	79	78	78	78	77	77	76	76	75	75	75	74	74	73	73	73	72	72	72	71	71
66	86	85	85	84	84	83	82	82	81	81	80	79	79	79	78	78	77	77	77	76	76	75	75	75	74	74	74
67	89	88	88	87	86	86	85	85	84	84	83	82	82	82	81	81	80	80	79	79	78	78	78	77	77	77	76
69	91	81	90	89	89	88	88	87	87	86	86	85	84	84	84	83	83	82	82	81	81	81	80	80	79	79	79
71	93	93	92	92	91	90	90	89	89	88	88	87	87	86	86	85	85	85	84	84	83	83	82	82	82	81	81
73	95	94	94	93	93	92	92	91	91	90	90	89	89	88	88	88	87	87	86	86	85	85	85	84	84	83	83
74	96	96	95	95	94	94	93	93	93	92	92	91	91	90	90	89	89	89	88	88	87	87	86	86	86	85	85
76	97	97	96	96	96	95	95	94	94	94	93	93	92	92	92	91	91	90	90	89	89	89	88	88	87	87	87
77	98	98	97	97	97	96	96	96	95	95	94	94	94	93	93	93	92	92	91	91	91	90	90	89	89	89	88
79	98	98	98	98	97	97	97	97	96	96	96	95	95	95	94	94	93	93	93	92	92	92	91	91	91	90	90
80	99	99	99	98	98	98	98	97	97	97	96	96	96	96	95	95	95	94	94	94	93	93	93	92	92	91	91
82	100	100	100	99	99	98	98	98	98	97	97	97	97	96	96	96	96	95	95	95	94	94	94	93	93	93	92
83	100	100	100	100	100	99	99	98	98	98	98	98	97	97	97	97	96	96	96	96	95	95	95	94	94	94	93
84	100	100	100	100	100	100	100	99	99	99	98	98	98	98	98	97	97	97	97	96	96	96	95	95	95	95	94
85	100	100	100	100	100	100	100	100	100	100	99	99	98	98	98	98	98	97	97	97	97	96	96	96	96	95	95
86	100	100	100	100	100	100	100	100	100	100	100	100	99	99	98	98	98	98	98	98	97	97	97	97	96	96	96
87	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	98	98	98	98	98	97	97	97	97	97
88	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	98	98	98	98	98	98	97	97
89	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	98	98	98	98	98	98	98
90	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	98	98	98	98
91	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99	99	99	98
92	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99

Table 18

Questions for Determining Your Differentiated Profile

a. About what percentage of the pupils served by your school fall into each of the categories below (the total should equal 100%):

Children of professionals (doctors, lawyers, engineers, etc.), managers (executives, etc.), or white-collar workers (proprietors, salesmen, clerks, etc.)	
Children of skilled workers (electricians, carpenters, repair men, factory workers, etc.) or unskilled workers (laborers, janitors, dishwashers, etc.)	

○ *If the first entry is equal to or greater than 30% put a "1" in the circle at the left; otherwise put a "0" in the circle.*

b. About what percentage of the students in your school are white? _____percent.

○ *If your answer is 90% or more, put a "1" in the circle at the left; otherwise put a "0" in the circle.*

c. What are the first three digits of your school's ZIP code? _____

○ *If your numbers are from 010-196; 430-588; or 600-693 put a "1" in the circle at the left; otherwise put a "0" in the circle.*

d. About what percentage of the students who attended your school last year are no longer attending your school (do not count those who have graduated or are being bussed to other schools)? _____percent.

○ *If your answer is 4% or less, put a "1" in the circle at the left, otherwise put a "0" in the circle.*

e. About what percentage of the students in your school speak a language other than English outside of school or come from homes in which a language other than English is spoken most of the time? _____percent.

○ *If your answer is 2% or less, put a "1" in the circle at the left; otherwise put a "0" in the circle.*

f. Is formal approval requested from your schools' teachers to initiate new educational programs (e.g., team teaching, new curricula, ungraded classrooms, tracking, resource rooms, etc.) in your school? _____

○ *If your answer is "yes", put a "1" in the circle at the left; otherwise put a "0" in the circle.*

The numbers, in order, written in the circles above are _ _ _ _ _ _.
This is your school's Differentiated Profile.

Appendix A

SCHOOL CHARACTERISTICS QUESTIONNAIRE

Name _____

Address _____

School Name _____ School ZIP Code _____

---

1. How many students are enrolled in your school at each of the following grade levels:

   K _____
   1 _____
   2 _____
   3 _____
   4 _____
   5 _____
   6 _____
   7 _____
   8 _____

2. About what percentage of the students who attended your school last year are no longer attending your school (do not count those who have graduated or are being bussed to other schools)?

   _____%

3. How old is the main classroom building of your school plant?

   _____years old.

4. About what percent of the families of your students are represented at a typical meeting of the PTA or similar parent group?

   _____%

5. Which one of the following categories best describes the neighborhood served by your school?

   _____a. rural area
   _____b. residential suburb
   _____c. industrial suburb
   _____d. small town (5,000 or less)
   _____e. city of 5,000 to 50,000
   _____f. residential area of a large city (50,000+)
   _____g. inner part of a large city (50,000+)

*6. About what percentage of students in your school have mothers who are employed outside of the home?

   _____%

7. From which of the following groups (check all that apply) is formal approval required to initiate new education programs in your school (e.g., team teaching, new curricula, ungraded classrooms, tracking, resource rooms, etc.)?

   _____Board of Education
   _____Superintendent
   _____District administration other than Superintendent
   _____Parents
   _____Teachers
   _____No formal approval needed

8. What is the copyright date of the regular class reading book used in your third grade?

   _____

---

*See accompanying sheet for optional estimation procedures

9. About what percentage of the students in your school are white?

_____%

10. What is the starting annual salary of a beginning teacher in your school system

$_____

*11. About what percentage of this year's first grade students in your school attended Kindergarten or its equivalent?

_____%

*12. About what percent of the students in your school are living in homes in which there is only one parent?

_____%

*13. About what percentage of the students in your school speak a language other than English outside of school or come from homes in which a language other than English is spoken most of the time?

_____%

*14. About what percentage of the pupils served by your school fall into each of the categories listed in the chart below (the total should equal 100%)

Occupational Category	%
children of professional and managers (doctors, lawyers, engineers, executives, etc.)	
children of white collar workers other than those in (a) above (proprietors, salesmen, clerks, etc.)	
children of skilled workers (electricians, carpenters, repair men, factory workers, etc.)	
children of unskilled (laborers, janitors, dishwashers, etc.)	
TOTAL	100%

15. About how many catalogued volumes are there in your school library?

_____ volumes

16. What is the average full-time teaching experience of the teaching staff of your school (consider counseling as teaching experience)?

_____years

17. What is the approximate average annual salary of the teaching staff in your school?

$_____

18. Please indicate in the chart below the numbers of hours per week that each of the specified kinds of people are working in your school:

Type of person	# of hours per week
Guidance Counselor	
Psychologist	
Child Welfare & Attendance Officer	
Nurse	
Speech Therapist	
Remedial Reading Specialist	
English-Second-Language Specialist	
Art Teacher	
Music Teacher	
Sex Education Consultant	
Librarian	
Teacher Aides	

*See accompanying sheet for optional estimation procedures.

4/2/a

Appendix B

Coding of the School Characteristics Questionnaire for ETS Data.

General Instruction: If a response is blank or ?, code as blank.

COLUMNS	INFORMATION
	First Card
1-7	ZIP code
8	a "1"
9-10	blank
11-13	No. of students in grade 3, if it is checked
14-16	No. of students in grade 4, if it is checked
17-19	No. of students in grade 5, if it is checked
20-22	No. of students in grade 6, if it is checked
23-25	No. of students in grade 7, if it is checked
26-28	No. of students in grade 8, if it is checked
29-30	Question 2 (2 digits; round to whole number)
31-32	Question 3 (2 digits; round to whole number) (If age is >99 years, put 99)
33-34	Question 4 (2 digits; round to whole number)
	Question 5
35	1 if 5a is checked; blank otherwise
36	1 if 5b is checked; blank otherwise
37	1 if 5c is checked; blank otherwise
38	1 if 5d is checked; blank otherwise
39	1 if 5e is checked; blank otherwise
40	1 if 5f is checked; blank otherwise
41	1 if 5g is checked; blank otherwise
42-43	Question 6 (2 digits; round to whole number)
	Question 7
44	1 if Board of Education is checked; blank otherwise
45	1 if Superintendent is checked; blank otherwise
46	1 if District Administration is checked; blank otherwise
47	1 if Parents is checked; blank otherwise
48	1 if Teachers is checked; blank otherwise
49	1 if No formal approval; blank otherwise
50	Total number of checks, not counting "No formal approval"

51-52	Question 8 (last 2 digits of year; if year is 1966, put 66; if no year, leave blank)
53-54	Question 9 (2 digits; round to whole number)
55-57	Question 10 (3 digits; salary in hundreds of dollars; e.g., $9000 = 90, $15100 = 151; i.e., drop the last 2 numbers, rounding off if necessary).
58-59	Question 11 (2 digits; round to whole number)
60-61	Question 12 (2 digits; round to whole number)
62-63	Question 13 (2 digits; round to whole number)
	Question 14
64-65	Professional managers (2 digits; round to whole number)
66-67	White Collar (2 digits; round to whole number)
68-69	Skilled Worker (2 digits; round to whole number)
70-71	Unskilled Worker (2 digits; round to whole number)
72-74	Question 15 (3 digits; No. of volumes in hundreds; e.g., 3700 = 37; 900 = 9; 11,400 = 114; i.e., drop last 2 numbers rounding off if necessary)
75-76	Question 16 (2 digits; round to whole number)
77-79	Question 17 (3 digits; salary in hundreds of dollars; same as in Question 10)

Second Card

1- 7	ZIP code
8	a "2"
9-10	blank
	Question 18
11-13	Guidance Counselor (3 digits, # of hours per week)
14-16	Psychologist (3 digits, # of hours per week)
17-19	Child Welfare (3 digits, # of hours per week)
20-22	Nurse (3 digits, # of hours per week)
23-25	Speech Therapist (3 digits, # hours per week)
26-28	Remedial Reading (3 digits, # of hours per week)
29-31	English-Second-Language (3 digits, # of hours per week)
32-34	Art Teacher (3 digits, # of hours per week)
35-37	Music Teacher (3 digits, # of hours per week)
38-40	Sex Education (3 digits, # of hours per week)
41-43	Librarian (3 digits, # of hours per week)
44-46	Teacher Aides (3 digits, # of hours per week)
47-50	Total # of hours (4 digits; you have to do addition)

Coding of Achievement Data Received from ETS

COLUMNS	INFORMATION
Third Card	
1-7	ZIP code
8	the number "3"
9	grade (3, 4, 5, 6, 7, or 8)
10	blank
11-15	SCAT-V mean (ignore the decimal point)
16-20	SCAT-M mean (ignore the decimal point)
21-25	SCAT-T mean (ignore the decimal point)
26-30	TEST-1 mean (ignore the decimal point)
31-35	TEST-2 mean (ignore the decimal point)
36-40	TEST-3 mean (ignore the decimal point)
41-45	TEST-4 mean (ignore the decimal point)
46-50	TEST-5 mean (ignore the decimal point)
51-55	TEST-6 mean (ignore the decimal point)
56-60	TEST-7 mean (ignore the decimal point)

(Note: each class will have only one or two means for tests 1-7. They are indicated under the headings STEP-1 and STEP-2 by the column labeled TEST. There are instances of tests 8 and 9, but ignore these.)

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